Accelerating Superfund Cleanup through Engineered Plume Collapse (EPC)

Ed Folsom

Environmental Restoration Division, Lawrence Livermore National Laboratory
P.O. Box 808, L-544, Livermore, CA 94551, USA – Phone: (925) 422-0389

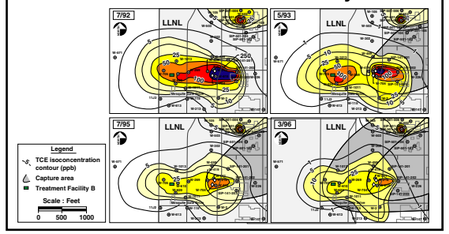
Work performed under the auspices of the U. S. Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

UCRL-MI-135725

Introduction

- Successful Record of Decision (ROD) cleanup at LLNL is being accelerated by a new environmental strategy know as EPC.
- ERD is using EPC to prioritize tasks and to allocate scarce resources to clean up the LLNL Livermore Site.

TCE concentration time series maps for HSU 1B in Treatment Facility B



How is Engineered Plume Collapse Different from the ROD Cleanup Plan?

EPC provides a framework to apply and integrate many cleanup elements that were not considered in the ROD:
- Hydrostratigraphic Unit (HSU) analysis for targeting cleanup.
- Isolating contaminant source areas to collapse the plumes.
- Portable Treatment Units (PTUs).
- Different cleanup approaches for fine-grained and coarse-grained sediments.
- Application of innovative technologies for source area cleanup.
- Early site-specific regulatory closure via No Further Action, Technical Impracticability or Containment Zones.

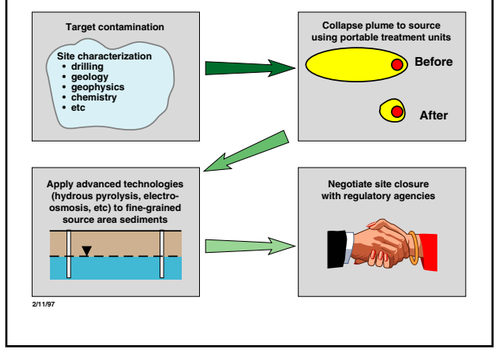
How is EPC an acceleration over the ROD Plan?

- Immediate installation of source control wells to stop the source of contaminants at their release sites.
- Recognizes the importance of quickly removing the source areas and evaluates optimal technologies for source area remediation.
- Uses PTUs rather than expensive fixed treatment facilities and underground pipelines.
- Provides flexibility to optimize cleanup by easily moving treatment facilities.
- Achieves cleanup to an early negotiated cleanup level on a plume-by-plume basis, such as at the gasoline spill area.
- Uses less expensive carbon filter units in place of PTUs at some locations.

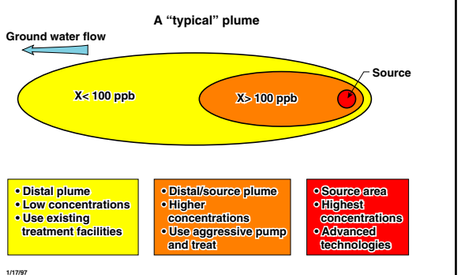
The Livermore Site Engineered Plume Collapse (EPC) strategy is an aggressive approach to cleanup

- EPC is an integrated, multi-disciplinary accelerated remediation strategy that incorporates the current western offsite plume cleanup.
- EPC achieves near term collapse of the plumes and subsequent cleanup of contaminant release points.
- EPC targets the most cost effective technologies on different portions of the plumes based on VOC concentration and subsurface conditions.

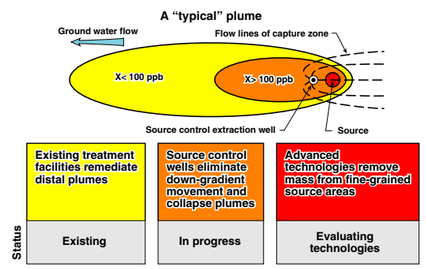
Engineered Plume Collapse is an integrated, phased strategy for accelerating site cleanup



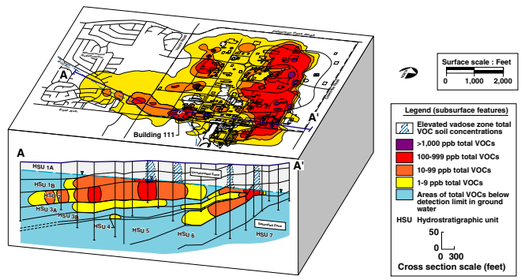
Engineered Plume Collapse focuses the right technologies at the right place at the right time



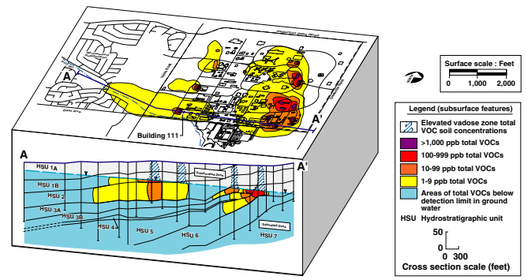
Engineered Plume Collapse reduces time and cost of cleanup



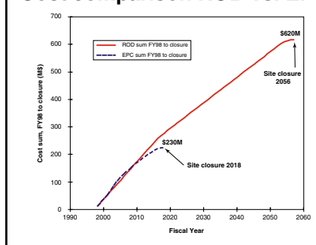
LLNL Livermore site block diagram showing distribution of VOC plumes prior to implementation of Engineered Plume Collapse



Estimated collapse of VOC plumes five years following full implementation of Engineered Plume Collapse



Cost comparison ROD vs. EPC



Results

- EPC implementation has resulted in a significant increase in VOC mass removal from the LLNL Livermore Site for a minimal increase in program funding.

Actual & estimated effect of implementing EPC in the TFD Area